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COMMONWEALTH OF AUSTRALIA



DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

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RECORD N<sup>o</sup>. 1962/148

TENNANT CREEK  
GROUND MAGNETIC SURVEY,  
NORTHERN TERRITORY 1958

*by*

*M. J. O'CONNOR and J. DALY*

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus or statement without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

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## SUMMARY

Following on the aeromagnetic survey made by the Bureau of Mineral Resources in 1956 over the Tennant Creek goldfield, certain areas were selected for detailed ground magnetic surveys. This Record describes the work done in 1958 over three of these areas.

Some of the suggestions made after the ground magnetic surveys in 1957, concerning the possible causes of magnetic anomalies, are considered in light of subsequent geological mapping and ground magnetic surveys. The results of the ground magnetic surveys in each of the three areas are discussed. The interpretation of magnetic anomalies is based mainly on profiles of the horizontal component. Comparisons are shown of observed profiles (vertical and horizontal components) with profiles calculated for spherical bodies magnetised by induction.

The recommendations for testing the results of the ground magnetic surveys of 1957 and 1958 are listed. Ten possible drill hole sites are suggested.

## 1. INTRODUCTION

Following on the aeromagnetic survey performed by the Bureau of Mineral Resources in 1956 over the Tennant Creek goldfield, certain areas were selected for detailed ground magnetic surveys. Portion of the programme was completed in 1957, and has been described by O'Connor, Goodchild, and Daly (1959). The remainder of the work was done in the 1958 field season, and is the subject of the present Record.

The field work was done between June and September 1958. The party consisted of M.J. O'Connor (party leader), M.E. McGirr, R.J. Goodchild and B.J. Bamber, geophysicists (each for portion of the survey), two surveyors supplied by the Department of the Interior, and six field assistants.

The field work was done in the first instance at reconnaissance scale, with traverses 400 ft apart and stations 200 ft apart, as described by O'Connor *et al.* (1959). More detailed surveys were later made in certain smaller areas in which anomalies had been observed.

## 2. GEOLOGY AND AEROMAGNETIC SURVEY RESULTS

The most complete geological account of the Tennant Creek field has been given by Ivanac (1954). Geological field parties of the Bureau have carried out further detailed mapping during 1958-59. It is to be expected that this work will enable more precise conclusions to be drawn in detailed matters than were possible to Ivanac. A progress report has been issued (Crohn, Oldershaw, and Ryan, 1959).

A brief summary of Ivanac's report, in so far as it bears on the interpretation of the results of magnetic surveys, is given by Daly (1957) and will not be repeated here. One point may be mentioned that is relevant to some of the work discussed in the present Record. So far as is known, mineralisation in the Tennant Creek district is confined to rocks of the Warramunga Group. In the central part of the field, the most southerly outcrop of these rocks is along a line joining the Eldorado and Rising Sun mines. South of this line outcrops of granite are observed. Farther south, the country is soil-covered and devoid of outcrop for many miles. The next outcropping sedimentary rocks to the south are those of the Davenport Range, which are correlated with the Ashburton sandstone to the north of the Tennant Creek goldfield. As far as outcrop evidence is concerned, the southern limit of the Tennant Creek goldfield is a little south of the Eldorado/Rising Sun line.

In the report by O'Connor *et al.* (1959), certain suggestions were made as to possible causes of the main regional magnetic anomaly which extends across the southern portion of the area covered by the aeromagnetic survey (See Plate 1). Although no evidence directly bearing on this problem is yet available, the results of recent geological mapping tend to make one of the suggestions put forward less attractive.

The main regional anomaly consists of a magnetically-high area up to 5 miles wide, which can be traced for a length of about 30 miles. Such an anomaly might be caused by a body of simple shape, e.g. a horizontal cylinder, in which case the width of the anomaly would depend on the depth to the centre of the body; alternatively, it could be caused by a wide magnetic mass at relatively shallow depth, in which case the width of the anomaly would depend on the width of the body and not on the depth. It is considered that the first suggestion must be rejected, because the depth of such a body would be very great.

Also, close examination of the aeromagnetic map shows that there are quite steep magnetic gradients in some areas, notably at the eastern end of the anomaly. These steep gradients suggest that at least some parts of the magnetic body must be close to the surface.

O'Connor et al. (1959) suggested that this anomaly could be due to a folded formation of magnetic material that is not represented in outcrop. It is now considered that this suggestion is not worthy of much attention. It was based on analogy with conditions near Run Jungle. However, geological conditions in the two areas are quite dissimilar, so the suggestion must be regarded as a remote possibility only.

It seems very likely that the regional magnetic anomalies are due to disseminations of magnetite in rocks otherwise no different from those of the Warramunga Group in general. Crohn et al. (1959) records that impregnations of haematite occur frequently in outcropping sediments of the Warramunga Group, and it is consistent with conditions on the field that such haematite-rich zones are the weathered equivalent of magnetite-rich zones below water level. It seems reasonable to suppose that the distribution of magnetite has been subject to at least two controls:

- (a) a control, probably tectonic, acting on a regional scale, that has favoured the introduction of disseminated magnetite into considerable areas of Warramunga sediments
- (b) a further control that has produced the relatively small bodies of massive magnetite with which ore is associated. From Crohn et al. (1959) it appears that the nature of this control may be far from simple.

The information on the extent and disposition of the magnetite-rich zones is a very important result of the aeromagnetic survey. It appears very unlikely that this information could have been obtained in any other way. As mentioned by Crohn et al. (1959), it is very difficult to obtain evidence directly bearing on this matter. Experience at Tennant Creek shows that, to a first approximation, the magnetite occurs only below the zone of weathering, which is at least 250 ft deep. Typical material for study can only be obtained from workings that have extended below water level. There are very few such workings, and also, they are confined to the immediate neighbourhood of massive ironstone. There must always remain a doubt as to the extent to which samples taken from these areas can be regarded as typical of rocks in other areas, in which massive magnetite bodies do not occur.

### 3. AREAS COVERED BY GROUND MAGNETIC SURVEYS

The basis on which the areas to be covered by the ground surveys were selected is described by O'Connor et al. (1959). Two main areas were selected, viz. Reservation No. 1, centred approximately at the Flynn Memorial, and Reservation No. 3, near the south-western corner of the area covered by the aeromagnetic survey. Two smaller areas were also surveyed, and are described below.

The following areas were surveyed during 1958:

- (a) The western portion of Reservation No. 1 (referred to as Area No. 1, western portion). The main part of the Reservation was covered during the 1957 survey, and the results described by O'Connor et al. (1959).
- (b) Reservation No. 3 (referred to as Area No. 3).
- (c) The Olive Wood area. A small area around the Olive Wood lease was surveyed at the request of Peko Mines N.L., which held prospecting rights. The results of this work have been described in a separate report (O'Connor and Daly, 1958).
- (d) A small area of the Boons one-mile area south of Tennant Creek, known as Area No. 5. This area covers a small aeromagnetic anomaly of circular shape, occurring in a soil-covered area. This anomaly is about five miles south of the southern limit of the field as known. It appeared that the aeromagnetic anomaly was similar in shape to some anomalies associated with the ironstone bodies of the Tennant Creek field; it was considered of interest to discover whether this similarity was confirmed by detailed investigation, in which case the limit of the known field would be extended to the south.

These areas covered by the Bureau's ground magnetic surveys in 1957 and 1958 are shown on Plate 1.

#### 4. TECHNICAL DETAILS

##### Surveying

The method laying out traverses was similar to that used during the 1957 season (O'Connor et al. 1959)

The areas for survey were chosen primarily with reference to magnetic anomalies shown on the aeromagnetic map, and were then specified in relation to existing survey marks. Reservation No. 1 was located accurately, with reference to survey marks. Although Reservation No. 3 was specified with relation to survey marks, the nearest of these was a considerable distance from the area. No trig. stations were visible from the area, and connexion to the nearest survey point would have required a traverse too long to be practicable. The area was therefore located on the ground by astrofixes. It was estimated that specific points would be located within 1000 ft by this method but comparison of the results of aerial and ground magnetic surveys correspond so closely that it is considered that the accuracy of positioning of the area is considerably better than this.

This position of Area No. 5 was fixed by a ground traverse about 5 miles long from a survey point on the Overland Telegraph line.



Magnetic

Instruments used for the magnetic surveys were magnetic variometers of the Schmidt type. Three variometers were used, one manufactured by E.R. Watts and Sons Ltd (Serial No. 61939) for measuring the vertical magnetic intensity, and two by Askania-Werke (Serial No. 521633 and 541479) used for measuring the vertical and the horizontal magnetic intensity.

The field procedure was the same as that used for the ground magnetic surveys near Tennant Creek in 1957 (O'Connor *et al.*, 1959).

5. RESULTS AND INTERPRETATIONReservation No. 1 (Area No. 1, Western portion).

The results of the reconnaissance survey of the western portion of Reservation No. 1 are shown as contours of vertical magnetic intensity on Plate 2. Plate 3 shows the results of a detailed survey of a small area known as Area 1C (named in conformity with the names used for areas covered by detailed surveys in the eastern portion of the Reservation during 1957).

The area contains at least 10 anomalies, most of which can be attributed to small bodies of ironstone. The strongest anomaly occurs in Area 1C. Plate 4 compares observed vertical and horizontal magnetic profiles along Traverse 24,200W with profiles calculated for a spherical body centred at a depth of 340 ft below 5900S. The fit of the calculated profiles to the observed profiles is moderately good, and indicates that the theoretical body represents the actual one in position to a reasonable degree of accuracy, but that the assumed depth may be a little too great. Assuming a value of 0.1 c.g.s. unit for the effective susceptibility, the radius of the body is about 80 ft; it appears that the magnetic portion of the body may extend from water level to a depth of about 400 ft. The body may also have, above water level, an oxidised portion which has not contributed to the magnetic anomaly.

Another anomaly of similar magnitude appears at the south-eastern corner of the area shown in Plate 2. An outcrop of ironstone occurs here, and it is considered that the anomaly indicates that this body of ironstone extends from the surface to a depth of about 350 ft.

Also shown on Plate 2 are a number of other anomalies that can be safely attributed to small magnetic bodies. It was considered that detailed surveys of these anomalies were not warranted, because the bodies responsible for the anomalies must be relatively small.

Reservation No. 3

The results of the survey over Reservation No. 3 are shown as contours of vertical magnetic intensity on Plate 5.



A feature of the results is the close correspondence with the results of the airborne survey as shown on Plate 1. This is a satisfactory check, both on the soundness of the method of contouring used for the airborne results, and on the accuracy of the method used for locating the area on the ground.

The area contains a number of anomalies, which have been numbered 1 to 14 on the plan. The most important ones have been covered by detailed surveys to allow of precise interpretation. These anomalies occur in a generally high magnetic zone, which extends across the area with a westerly strike. In general, the anomalies are elliptical with the long axis in the direction of the main magnetic zone, indicating that they are due to tabular bodies with a westerly strike.

The results of the detailed survey over Anomaly 1 are shown on Plate 6. Plate 13 compares observed vertical and horizontal magnetic profiles along Traverse 20,500W with profiles calculated for a spherical body centred at a depth of 535 ft below 4600N. The fit is reasonably close, indicating that a drill hole directed at the calculated position of the centre would give a good intersection of the body. Under the usual assumptions as to susceptibility, the calculated radius of the body is 185 ft.

Anomaly 2 is due to a smaller body. Plate 7 shows the results of the detailed survey and Plate 14 compares the vertical and horizontal-component profiles along Traverse 19,600W with profiles calculated for a spherical body centred at a depth of 435 ft below 4525N. The radius of the body is calculated as 120 ft. The fit is only fairly good, but the calculated position of the centre should be a satisfactory drilling target.

Anomaly 3 is an important one, with a general strike at an acute angle to the strike of the main magnetic zone. The results of the detailed survey are shown on Plate 8. From this it appears that, although the anomaly is obviously due to a magnetic body of considerable size, the shape of the anomaly in detail is complicated and strongly suggests that some of the magnetic material comes close to the surface. It is considered that this anomaly should be tested in the first instance by percussion drilling rather than diamond drilling.

Anomaly 4 is due to a body considerably elongated in an easterly direction. Results of detailed survey are shown on Plate 9. Plate 15 compares vertical and horizontal-component profiles along Traverse 16,400W with profiles calculated for a spherical body centred at a depth of 340 ft below 4545W. The radius of the body is calculated as 90 ft. The fit of the calculated curves with the observed curves is not good and although the calculated position of the centre is the best drilling target, it is obvious that the assumption of a spherical body must be less accurate than usual.

Anomalies 5 and 6 are smaller in amplitude, and recommendations for testing would be warranted if encouraging results were obtained from testing the larger anomalies.

Anomaly 7 is of smaller amplitude and rather indefinite in shape. No testing is warranted at present.

Anomaly 8 is also elongated in an easterly direction. It may be fitted with reasonable accuracy by profiles due to a spherical body centred at a depth of 450 ft below 3920N. This position could be used as a drill target, if one were required.

Results of the detailed survey over Anomaly 9 are shown on Plate 10. Profiles over this anomaly are of unusual shape and cannot be fitted by profiles calculated for a single spherical body. Apart from their general character, they show some small-scale irregularities, which indicate that weathered material with irregular magnetism may be present at very shallow depth. Plate 16 compares vertical and horizontal-component profiles along Traverse 9200W with profiles calculated for two spherical bodies, one small one centred at a depth of 270 ft below 1700N, and one considerably larger centred at a depth of 680 ft below 1340N. It is possible that the anomaly is actually due to a single pear-shaped body, with a flat dip to the south. The fit is by no means perfect, but is satisfactory to a first approximation and provides a basis for drilling targets.

Anomaly 10 is due to a body elongated in an easterly direction. Plate 11 shows the results of the detailed survey, and Plate 17 compares vertical and horizontal-component profiles along Traverse 8600W with profiles calculated for a spherical body centred at a depth of 435 ft below 3175N. The fit is close enough to show that this assumption provides a satisfactory target for drilling.

Anomalies 11 and 12 together form a magnetically-high area striking at an acute angle to the strike of the main magnetic zone. The sharp change in strike and the shape of the contours of Anomaly 12, suggest the possibility that a fault zone involving movement with a strong southerly component is present here and has affected the bodies responsible for these anomalies. A detailed survey would be necessary to locate drilling targets.

Anomaly 13 is the largest one on the reservation. Results of the detailed survey are shown on Plate 12. Plate 18 compares vertical and horizontal-component profiles along Traverse 5300W with profiles calculated for a spherical body centred at a depth of 800 ft below 3225S. The radius of the body is calculated as 290 ft, so it is of important dimensions. The fit is moderately good.

Anomaly 14 is a long zone with an easterly strike. Drill sites have been selected, though there would be little incentive to test this anomaly unless favourable results were obtained from testing Anomaly 13. The drill sites have been selected on the assumption that the anomaly is due to a spherical body centred at a depth of 650 ft. Plate 18 compares magnetic profiles along Traverse 5300W with profiles calculated for a spherical body centred at a depth of 630 ft below 1270S. Apart from some difference in level, the shapes of the observed and theoretical curves agree closely enough to suggest that the depth assumed is not greatly in error. A drill site (11a) has been selected on this traverse. However, it is suggested that the recommended drill hole (No. 11) on Traverse 4200W, which runs across the maximum of the anomaly, should be drilled first.

There are several other anomalies of smaller extent. For example, one on 15,000W and one a little south of Anomaly 8, are of favourable shape. Also, it seems very likely that a detailed survey would resolve each of Anomalies 6, 7, and 14 into several distinct anomalies.

Area No. 5

Contours of vertical magnetic intensity over Area No. 5 are shown on Plate 19. It will be noted that the results of the airborne magnetic survey, as shown on Plate 1, do not agree well either in shape or position with the results of the ground survey. It may be that the contours of the aeromagnetic represent the sum of a number of sharp anomalies of relatively small extent; also, Area No. 5 is close to the edge of the area covered by airborne survey, where the accuracy of positioning is not as well controlled as in the centre of the map.

Four anomalies are shown on the map, and are numbered 1 to 4, although Anomalies 1 and 2 are probably not caused by separate bodies. Anomalies 3 and 4 have not been completely outlined, as they are at the edges of the surveyed area. However, they appear to have the same character as the main anomaly.

The character of these anomalies is quite different from that of the general run of anomalies in the Warramunga Rocks. The main anomaly is due to a narrow tabular body at least 2500 ft long, with a north-westerly strike and probably a fairly steep dip. An area covering the central portion of the anomaly was surveyed in detail, and the results are shown in Plate 20. Plate 21 compares vertical and horizontal-component profiles along Traverse 2400E with profiles calculated for a spherical body centred at a depth of 320 ft below 1135S. The fit of the horizontal-component profiles is passable, but the observed anomaly in the vertical component is much less than the calculated one, indicating that the assumed spherical body is quite unlike the actual body causing the anomaly. If it were considered desirable to investigate the nature of the body the calculated position of the centre would be a suitable drill target. However, as indications suggest that it is so unlike the bodies of economic interest in the Tennant Creek field, there is no basis for recommending such testing.

It is suggested tentatively that this anomaly is similar in character to the anomalies in the contact zone between Warramunga rocks and Ashburton sandstones north of Tennant Creek, referred to by Crohn *et al.* (1959). It is probably due to a dyke of basic rock, and indicates that the southern boundary of the Warramunga rocks in this part of the field is not far south of the Noble's Nob mine.

6. RECOMMENDATIONS

Recommendations for testing the results of the work of the 1957 and 1958 seasons have been given by Daly (1959). The sites referring to the work covered by the present Record are listed in the table below. Sites have been marked on the ground by wooden pegs at the recommended collar sites and white painted star-droppers (steel fence posts) at the nearest grid points. The location of the steel posts is shown in the table.



<u>Area</u>	<u>Anomaly</u>	<u>Drill Hole No.</u>	<u>Collar</u>	<u>Steel Post</u>	<u>Bearing (mag)</u>	<u>Depression</u>	<u>Length (Ft)</u>
1	1C	4	24,200W/5740S	5700S	180°	65°	470
3	1	5	20,500W/4835N	4800N	180°	65°	800
	2	6	19,600W/4720N	4700N	180°	65°	600
	4	7	16,200W/4390N	4400N	0°	65°	500
	9	8	9200W/1670N	1700N	180°	65°	930
	9	8A	9200W/1820N	1800N	180°	65°	370
	10	9	8600W/3370N	3400N	180°	65°	620
	13	10	5300W/2855S	2800S	180°	65°	1200
	14	11	4200W/1120S	1000S	180°	65°	800
	14	11A	5300W/960S	1000S	180°	65°	875

No testing is recommended on Area 5.

Holes on Reservation 3 should be drilled in the following order:

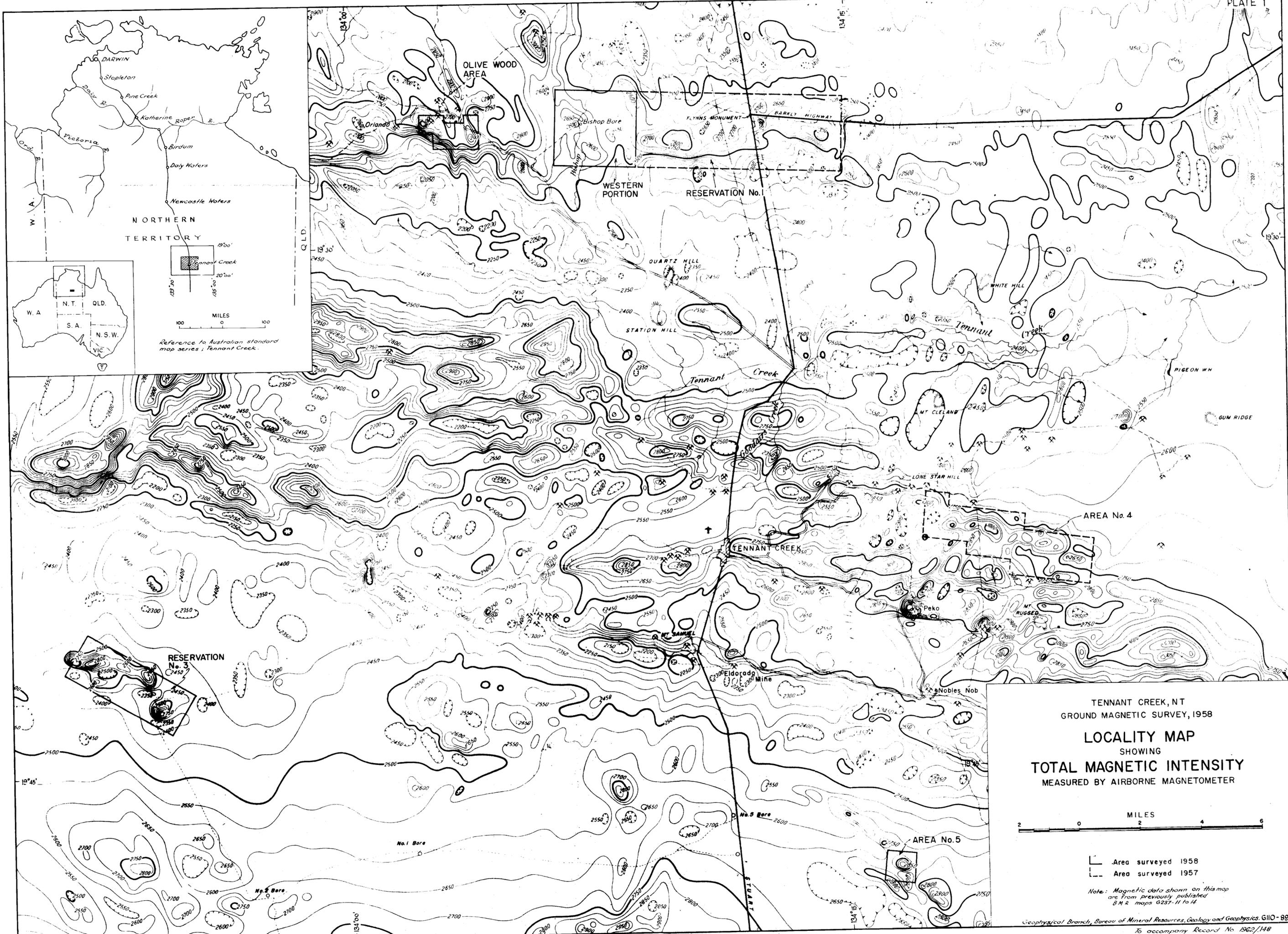
DDH 10, 5, 9, 7, 8, 11, 6.

Holes 8A and 11A should be drilled only if encouraging results are obtained from holes 8 and 11.

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survey at Tennant Creek, 1957.  
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1959/14.

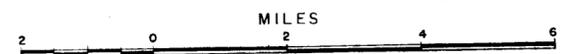


NORTHERN TERRITORY

Reference to Australian standard map series; Tennant Creek.

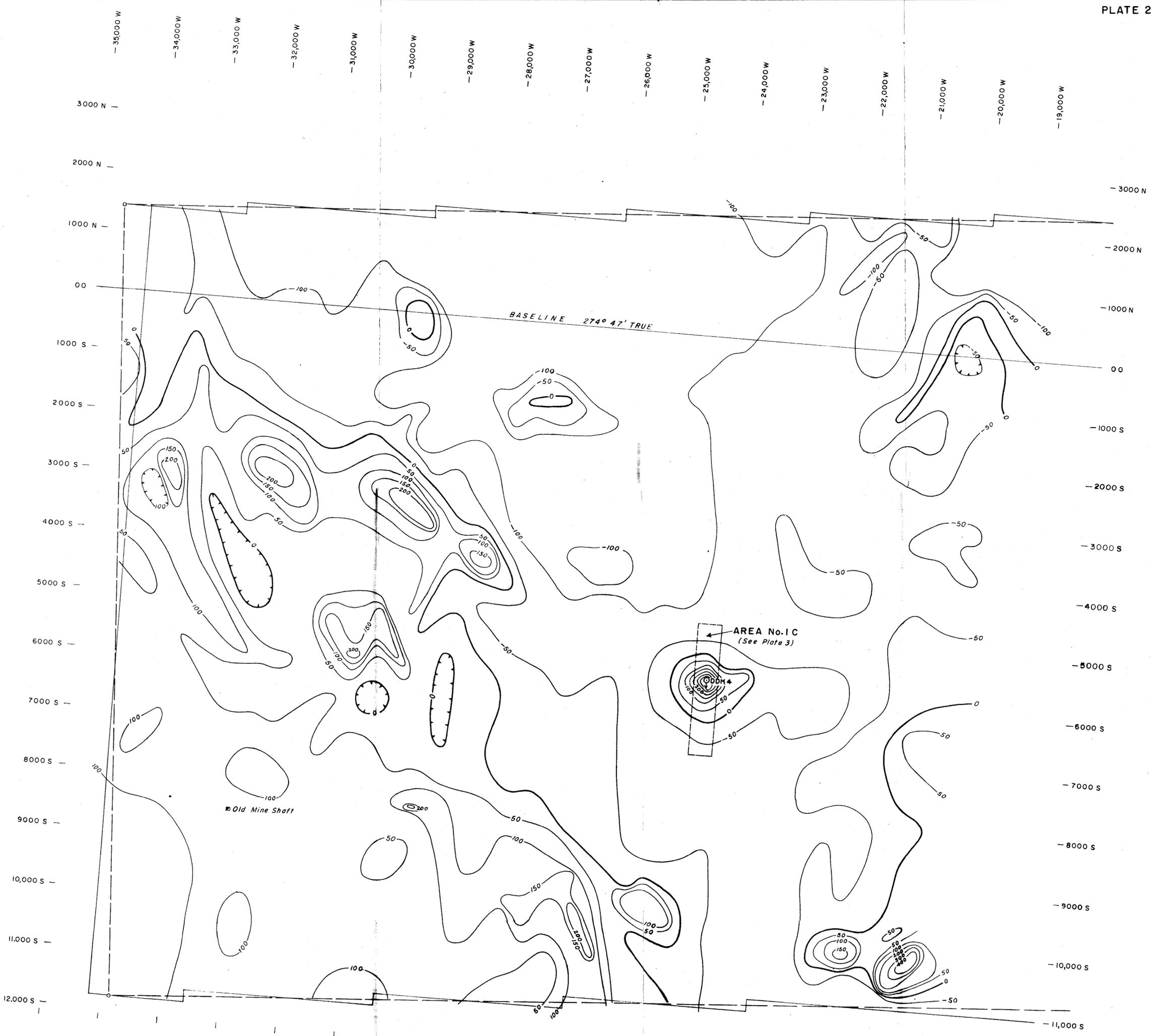
TENNANT CREEK, NT  
GROUND MAGNETIC SURVEY, 1958

**LOCALITY MAP**  
SHOWING  
**TOTAL MAGNETIC INTENSITY**  
MEASURED BY AIRBORNE MAGNETOMETER



- Area surveyed 1958
- - - Area surveyed 1957

Note: Magnetic data shown on this map are from previously published B.M.R. maps 6257-11 to 14.

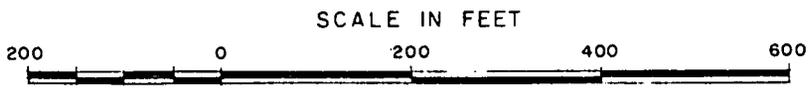
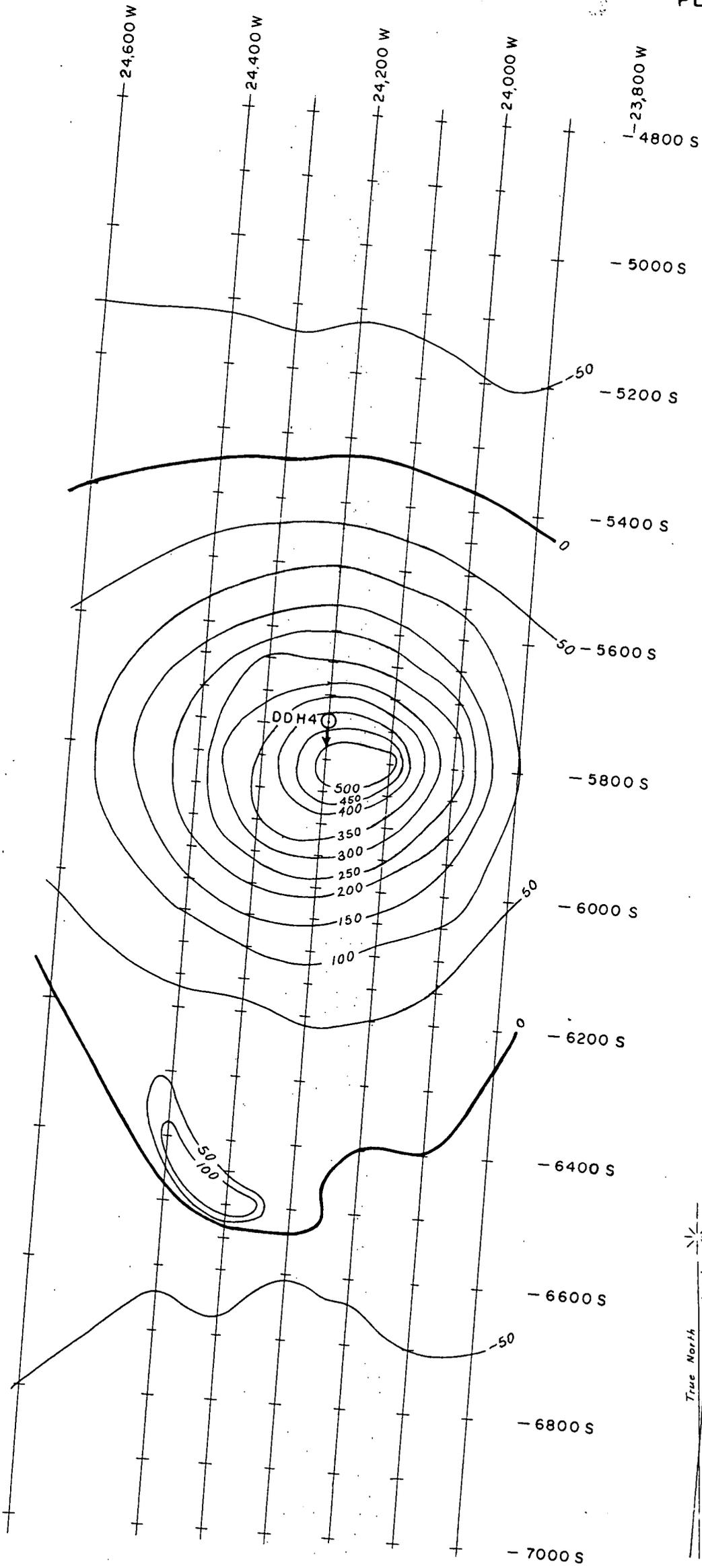


LEGEND

- MAGNETIC CONTOURS (IN GAMMAS)
- MAGNETIC 'LOW'
- BOUNDARY OF RESERVED AREA
- CORNER OF RESERVED AREA
- BOUNDARY OF SURVEYED AREA
- BOUNDARY OF DETAILED SURVEY AREA
- DDH 4 RECOMMENDED DRILL HOLE



AREA No. I (WESTERN EXTENSION)  
 CONTOURS OF  
 VERTICAL MAGNETIC INTENSITY

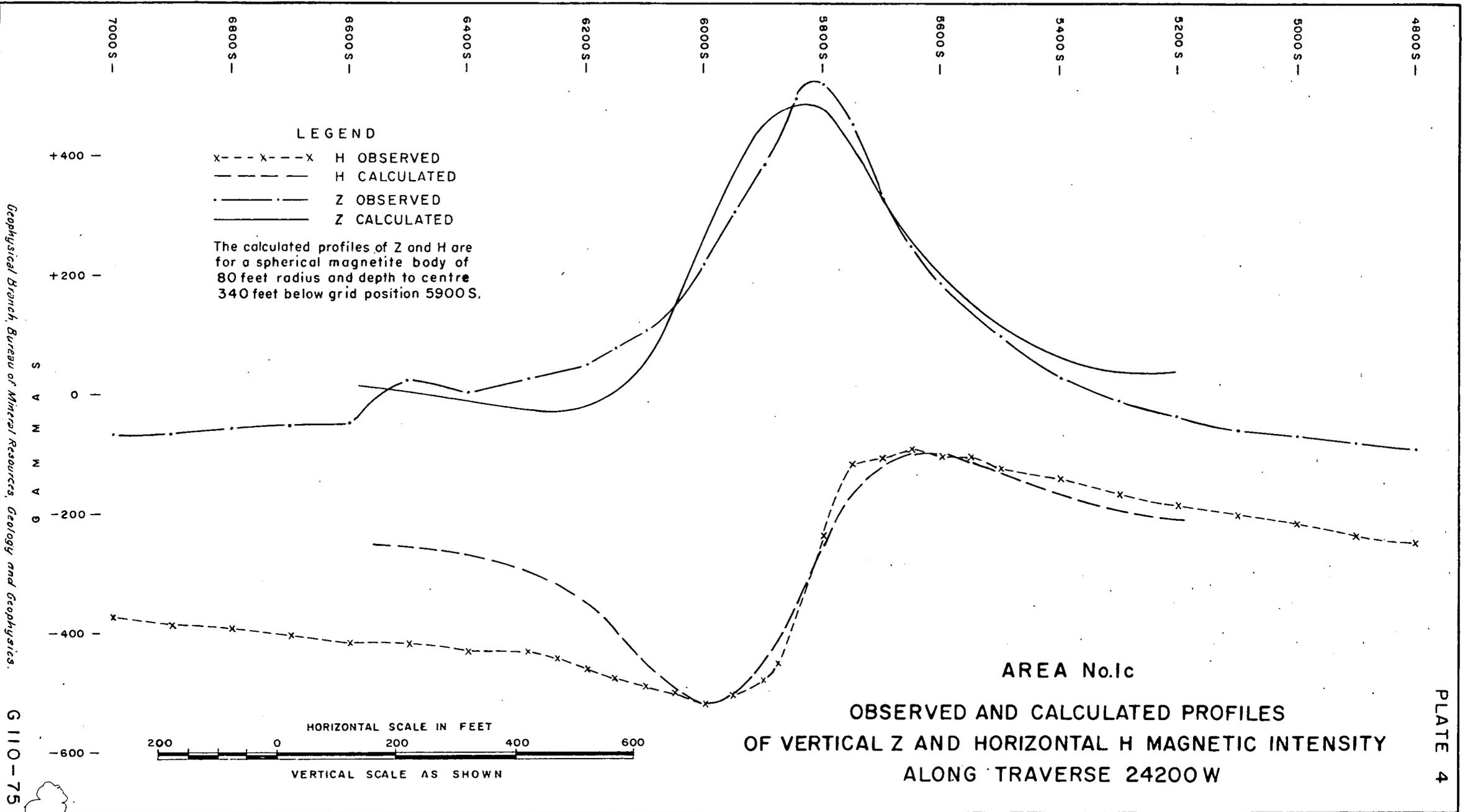


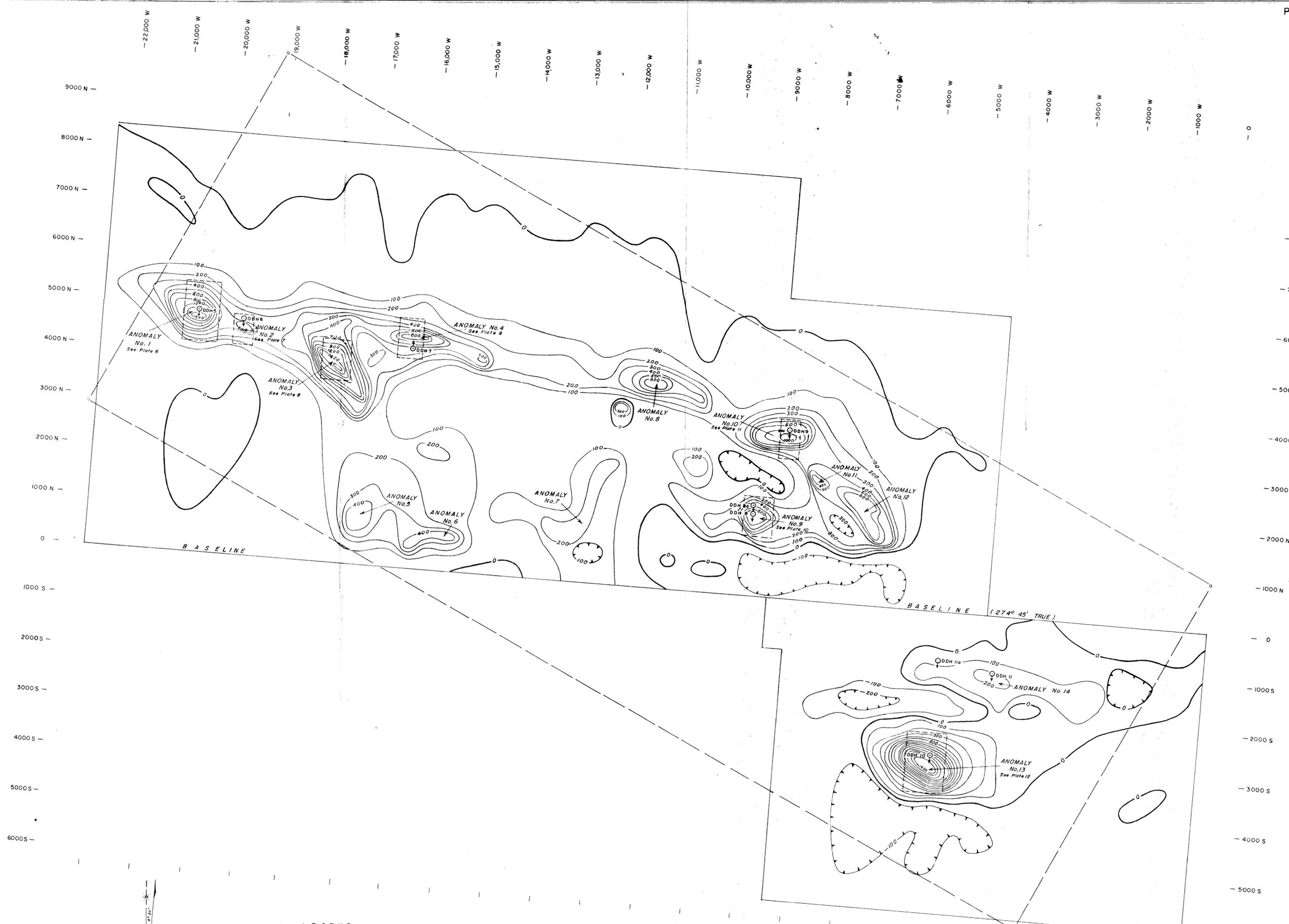
CONTOUR INTERVAL 50 GAMMAS

- LEGEND**
- MAGNETIC CONTOURS
  - MAGNETOMETER STATIONS
  - DDH 4 RECOMMENDED DRILL HOLE

**AREA No. 1c**  
**CONTOURS OF**  
**VERTICAL MAGNETIC INTENSITY**



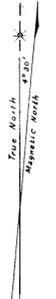




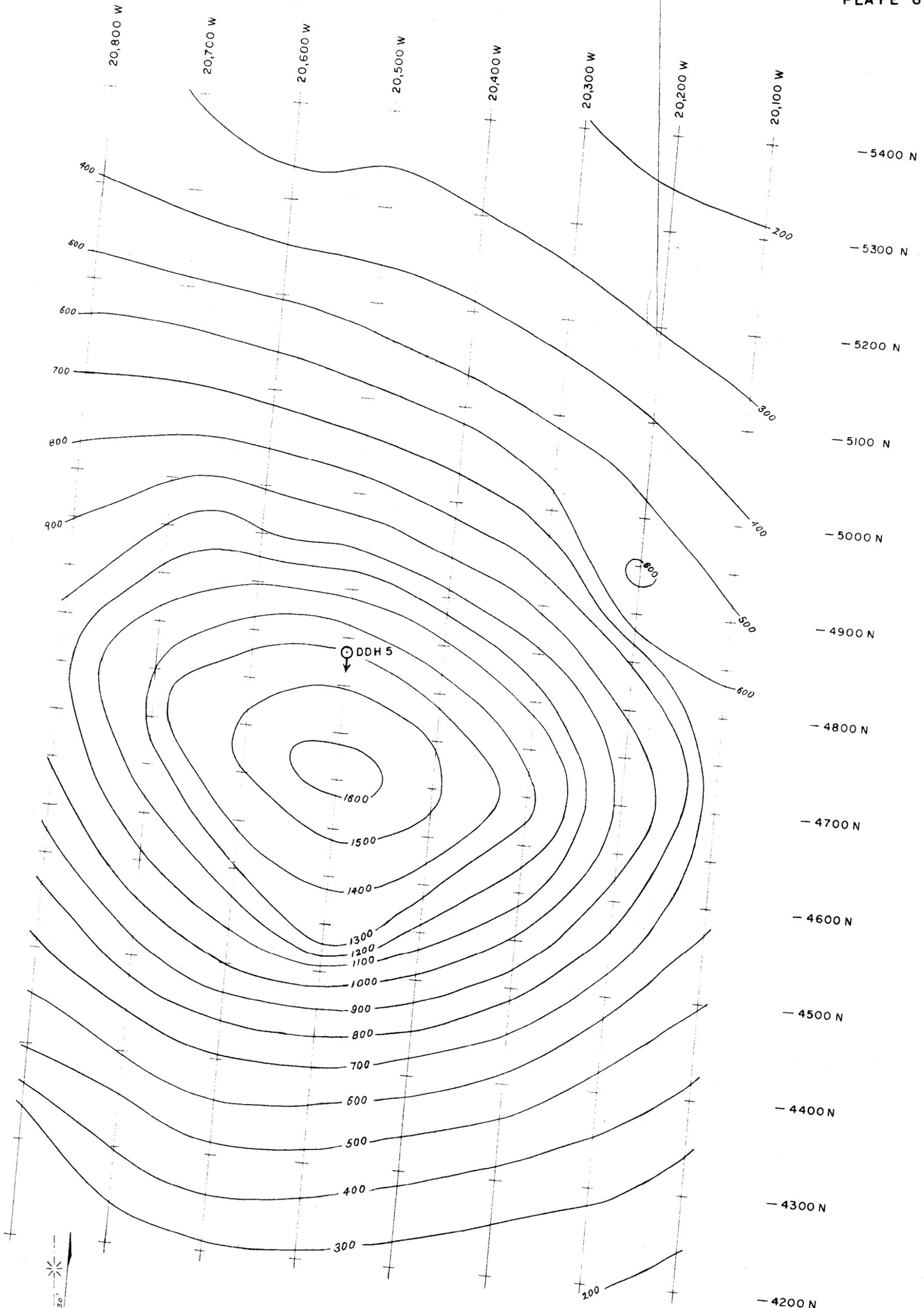
- LEGEND**
- MAGNETIC CONTOURS (IN GAMMAS)
  - MAGNETIC 'LOW'
  - BOUNDARY OF RESERVED AREA
  - CORNER OF RESERVED AREA
  - BOUNDARY OF SURVEYED AREA
  - BOUNDARY OF DETAILED SURVEY AREA
  - RECOMMENDED DRILL HOLE



**AREA No. 3**  
**CONTOURS OF VERTICAL MAGNETIC INTENSITY**



GROUND MAGNETIC SURVEY TENNANT CHALK 1954

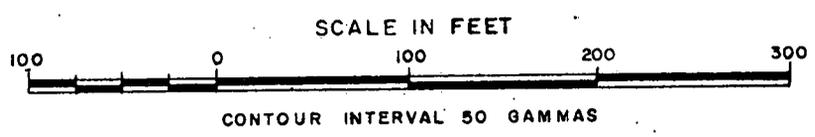
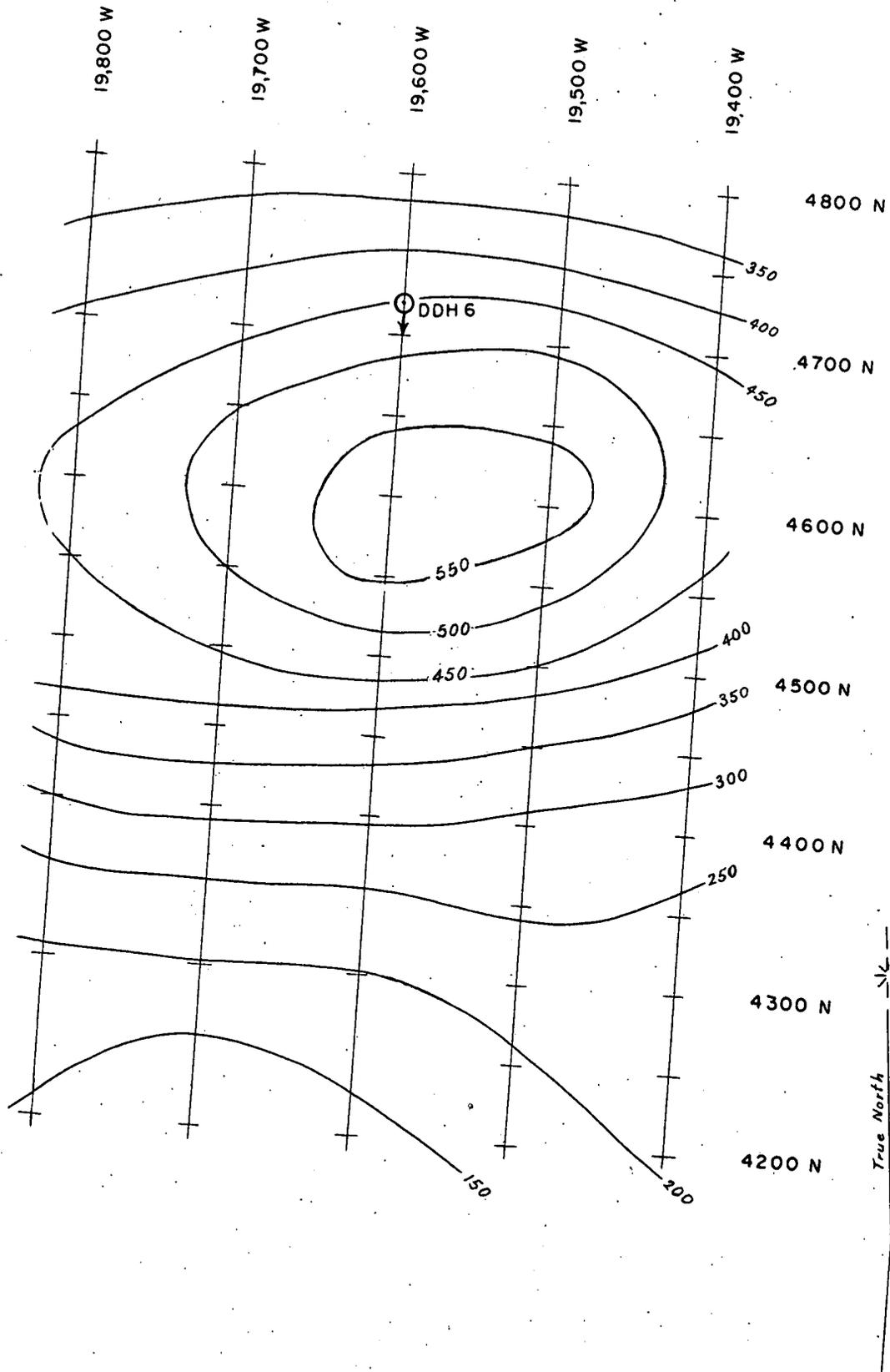


True North  
 42°30'  
 Magnetic North

- LEGEND
- 400 — MAGNETIC CONTOURS
  - 300 — MAGNETIC CONTOURS
  - MAGNETOMETER STATIONS
  - DDH 5 — RECOMMENDED DRILL HOLE

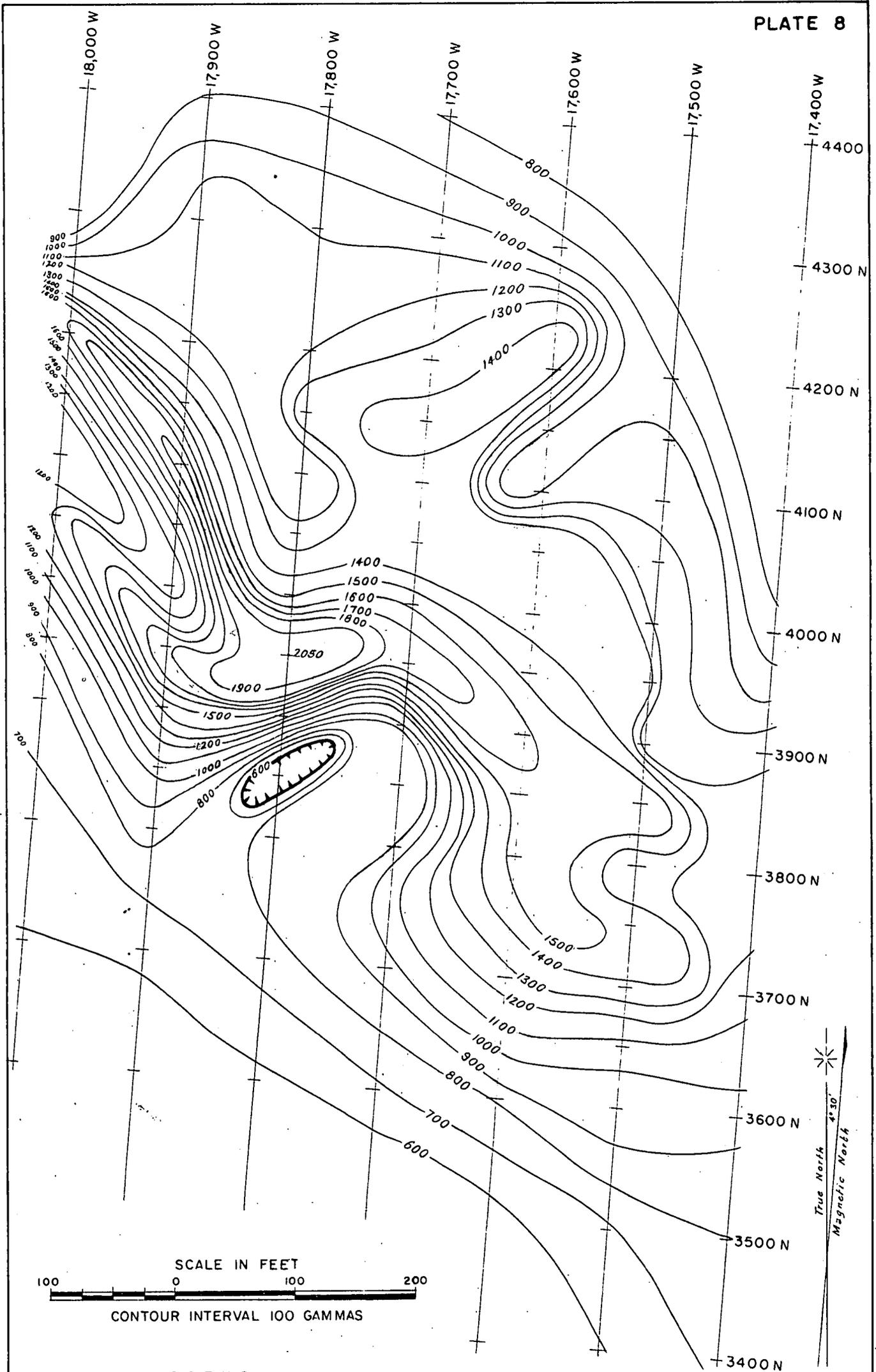


AREA No.3 — ANOMALY No.1  
 CONTOURS OF  
 VERTICAL MAGNETIC INTENSITY



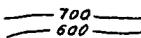
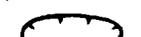
- LEGEND**
- 50 — MAGNETIC CONTOUR
  - — — — — MAGNETOMETER STATIONS
  - DDH 6 RECOMMENDED DRILL HOLE

**AREA No.3-ANOMALY No.2**  
**CONTOURS OF**  
**VERTICAL MAGNETIC INTENSITY**

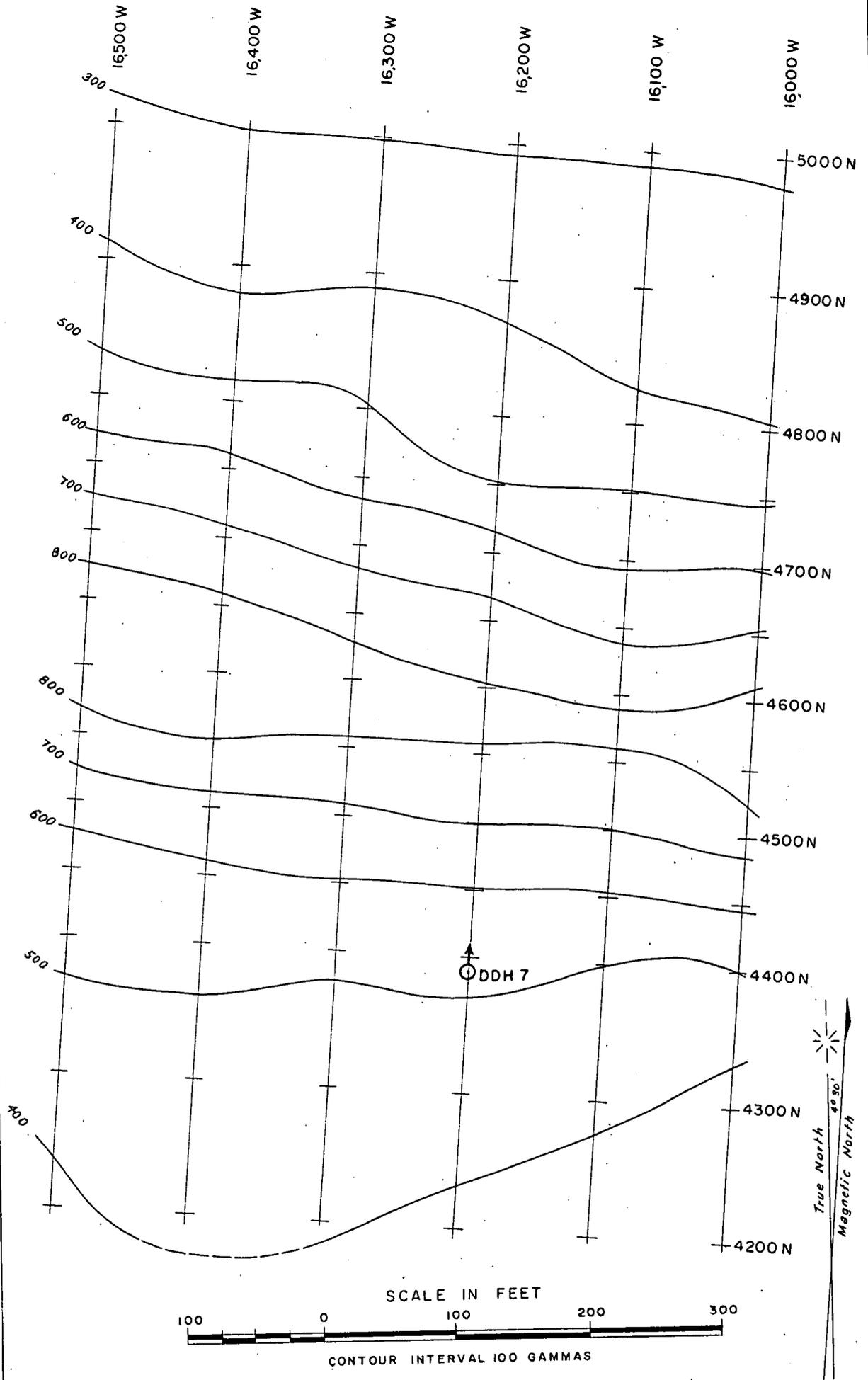


SCALE IN FEET  
 100 0 100 200  
 CONTOUR INTERVAL 100 GAMMAS

LEGEND

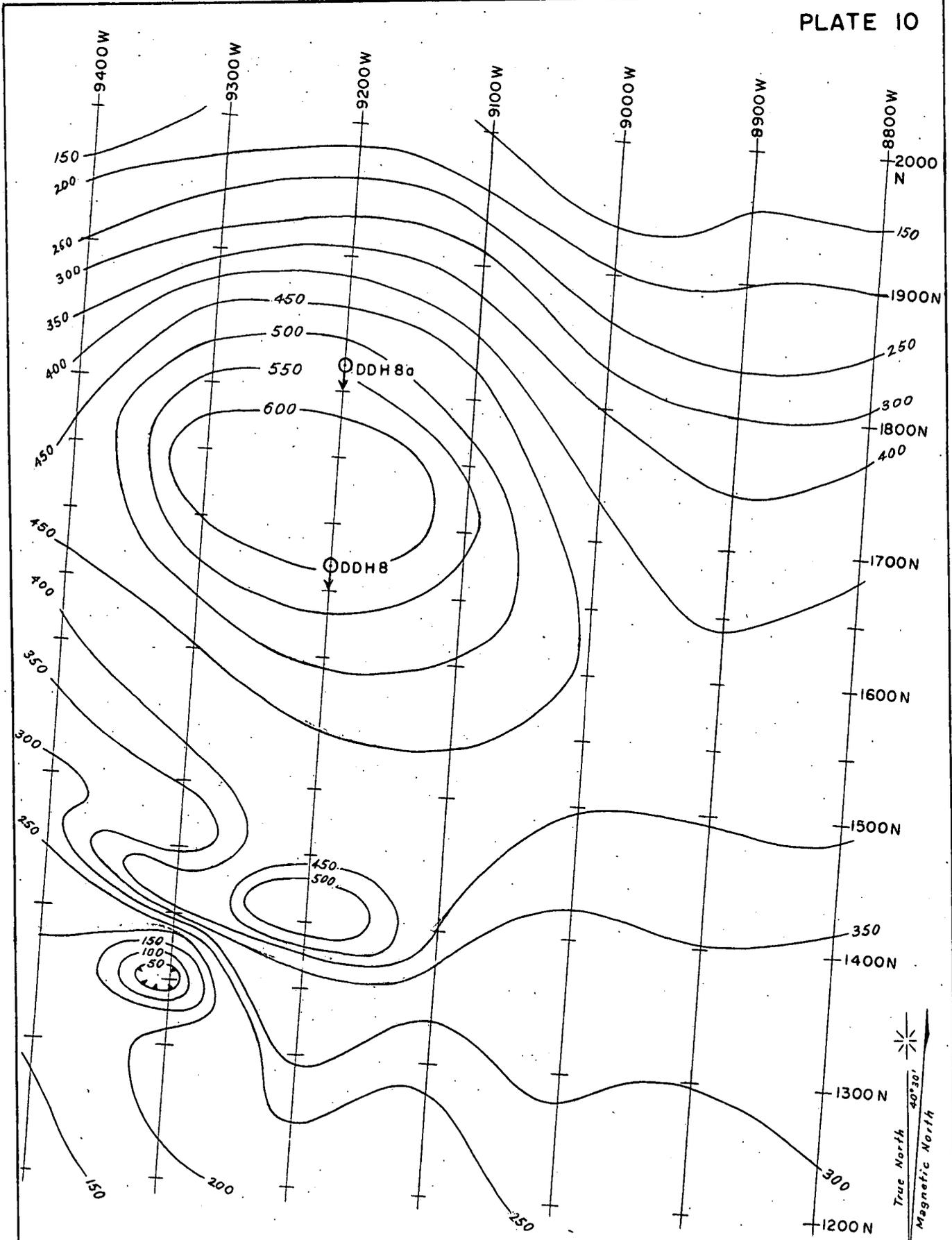
-  700  
 600
-  MAGNETIC 'LOW'
-  MAGNETOMETER STATIONS

AREA No.3 - ANOMALY No.3  
 CONTOURS OF  
 VERTICAL MAGNETIC INTENSITY



- LEGEND**
- 600 — MAGNETIC CONTOURS
  - 500 — MAGNETIC CONTOURS
  - MAGNETOMETER STATIONS
  - DDH7 RECOMMENDED DRILL HOLE

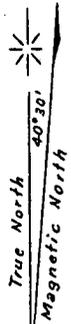
**AREA No.3-ANOMALY No.4**  
**CONTOURS OF**  
**VERTICAL MAGNETIC INTENSITY**

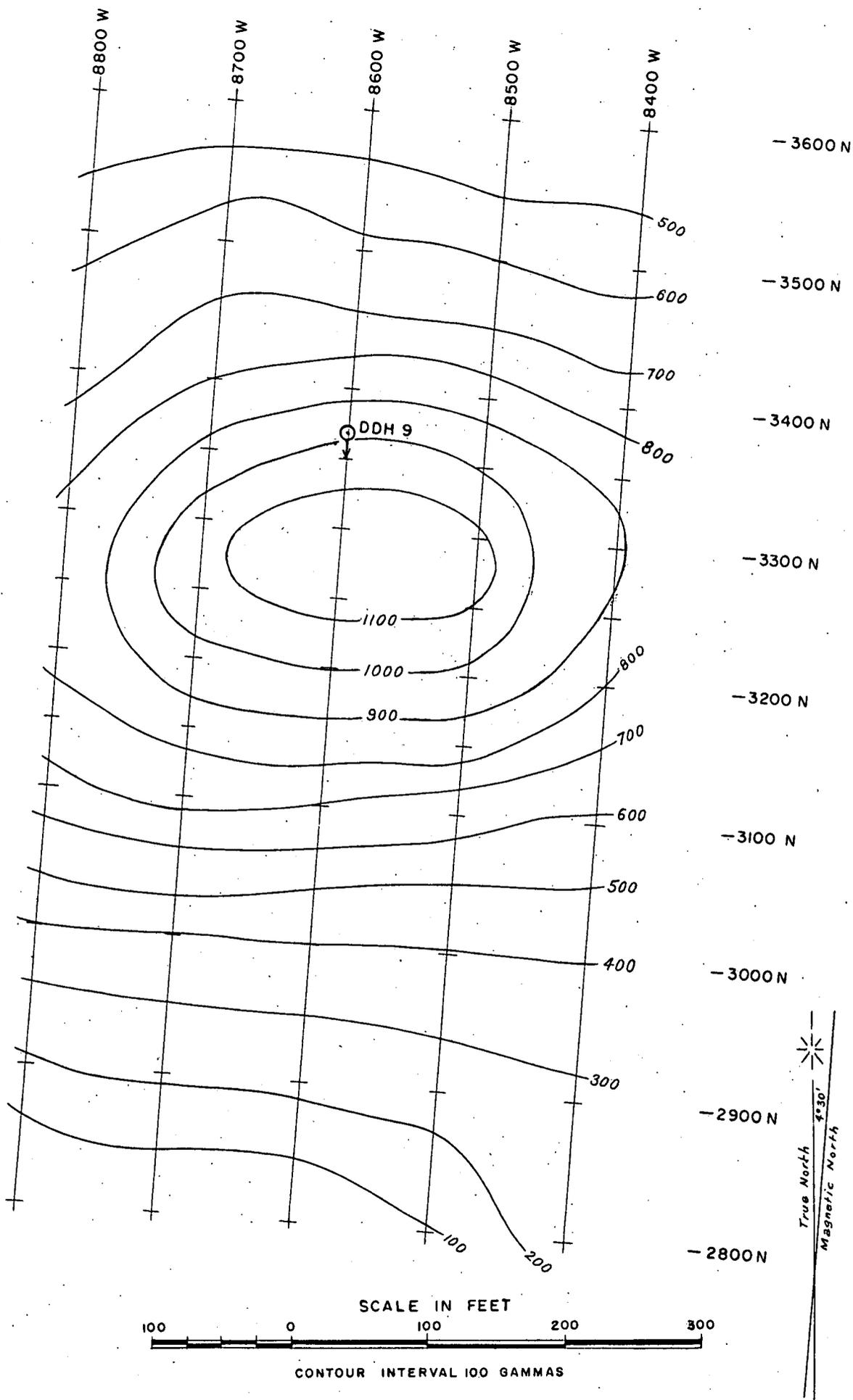


SCALE IN FEET  
 100 0 100 200  
 CONTOUR INTERVAL 50 GAMMAS

- LEGEND
- MAGNETIC CONTOURS
  - MAGNETIC 'LOW'
  - MAGNETOMETER STATIONS
  - DDH 8 RECOMMENDED DRILL HOLE

AREA No.3 - ANOMALY No.9  
 CONTOURS OF  
 VERTICAL MAGNETIC INTENSITY



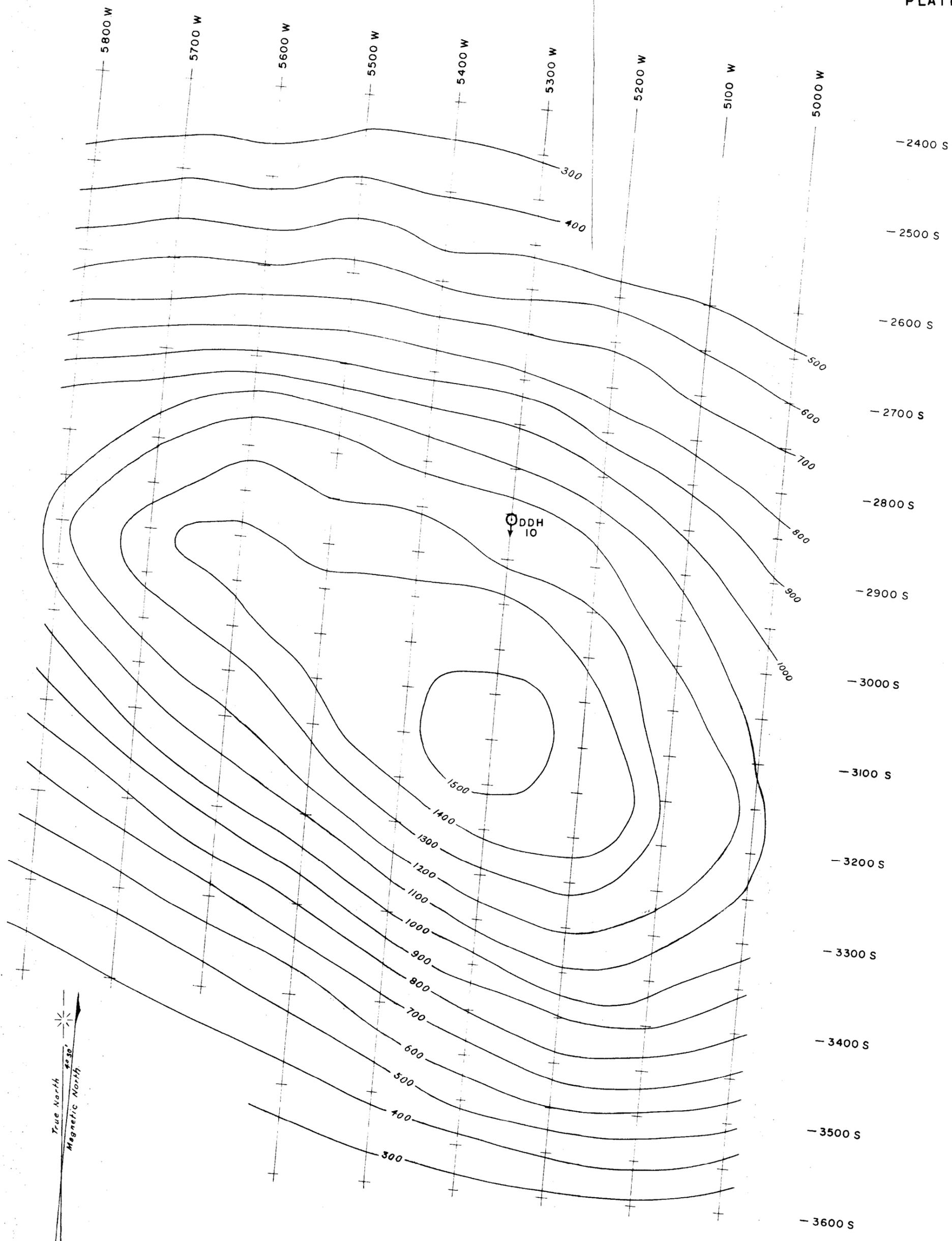


LEGEND

- MAGNETIC CONTOURS
- MAGNETOMETER STATIONS
- DDH 9 RECOMMENDED DRILL HOLE

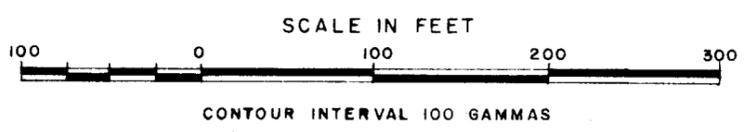
AREA No.3-ANOMALY No.10

CONTOURS OF VERTICAL MAGNETIC INTENSITY

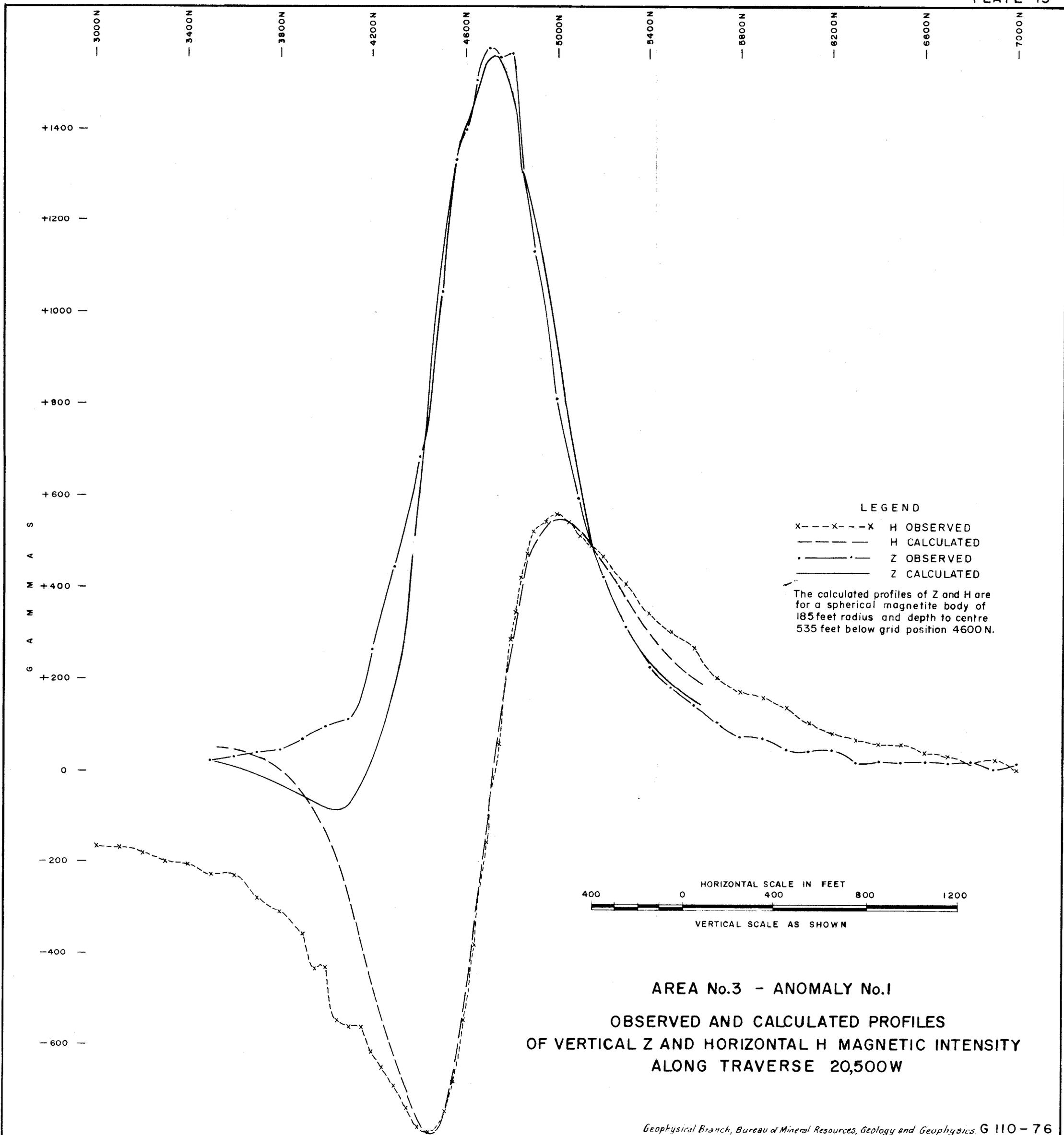


LEGEND

- 500 — MAGNETIC CONTOURS
- 400 — MAGNETIC CONTOURS
- MAGNETOMETER STATIONS
- DDH 10 RECOMMENDED DRILL HOLE



AREA No.3 - ANOMALY No.13  
CONTOURS OF  
VERTICAL MAGNETIC INTENSITY



LEGEND

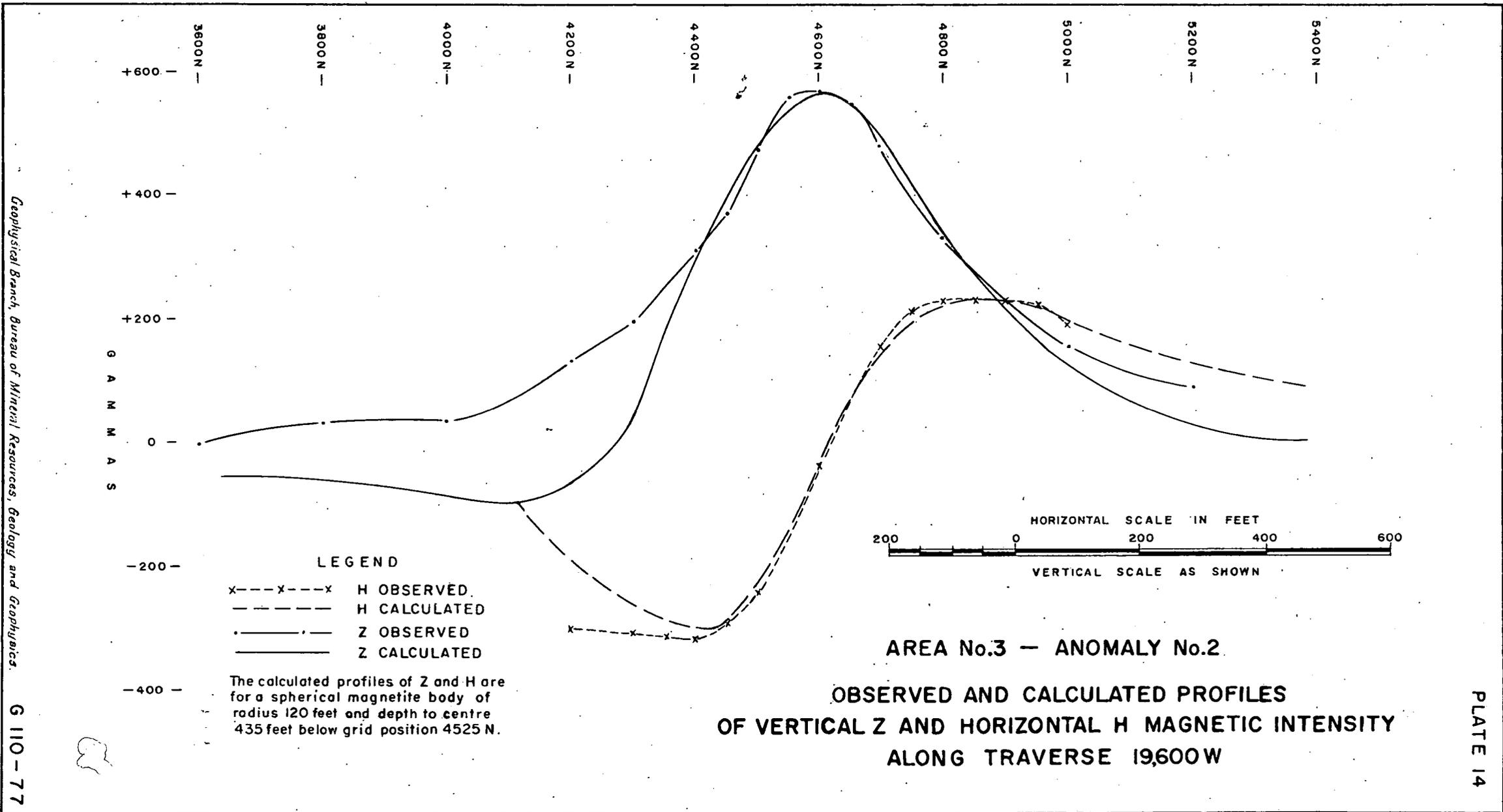
- x---x---x H OBSERVED
- H CALCULATED
- .----- Z OBSERVED
- Z CALCULATED

The calculated profiles of Z and H are for a spherical magnetite body of 185 feet radius and depth to centre 535 feet below grid position 4600N.

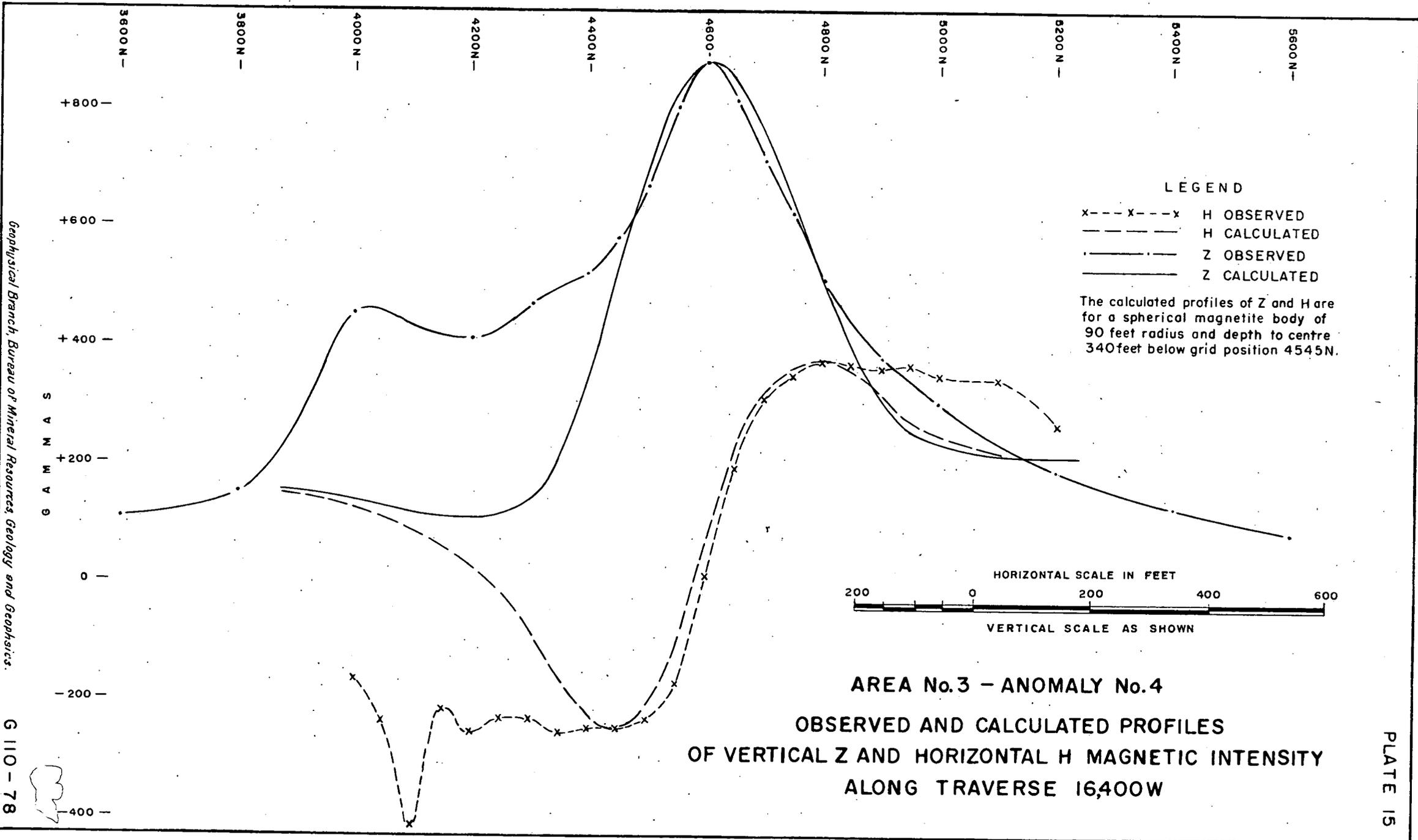
HORIZONTAL SCALE IN FEET  
 400 0 400 800 1200

VERTICAL SCALE AS SHOWN

AREA No.3 - ANOMALY No.1  
 OBSERVED AND CALCULATED PROFILES  
 OF VERTICAL Z AND HORIZONTAL H MAGNETIC INTENSITY  
 ALONG TRAVERSE 20,500W



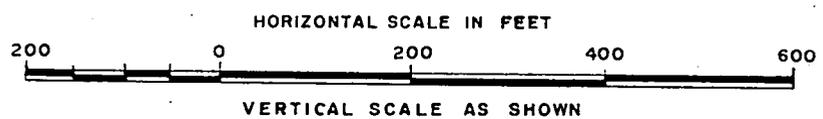
**AREA No.3 - ANOMALY No.2.**  
**OBSERVED AND CALCULATED PROFILES**  
**OF VERTICAL Z AND HORIZONTAL H MAGNETIC INTENSITY**  
**ALONG TRAVERSE 19600 W**



LEGEND

- x---x---x H OBSERVED
- H CALCULATED
- ..... Z OBSERVED
- Z CALCULATED

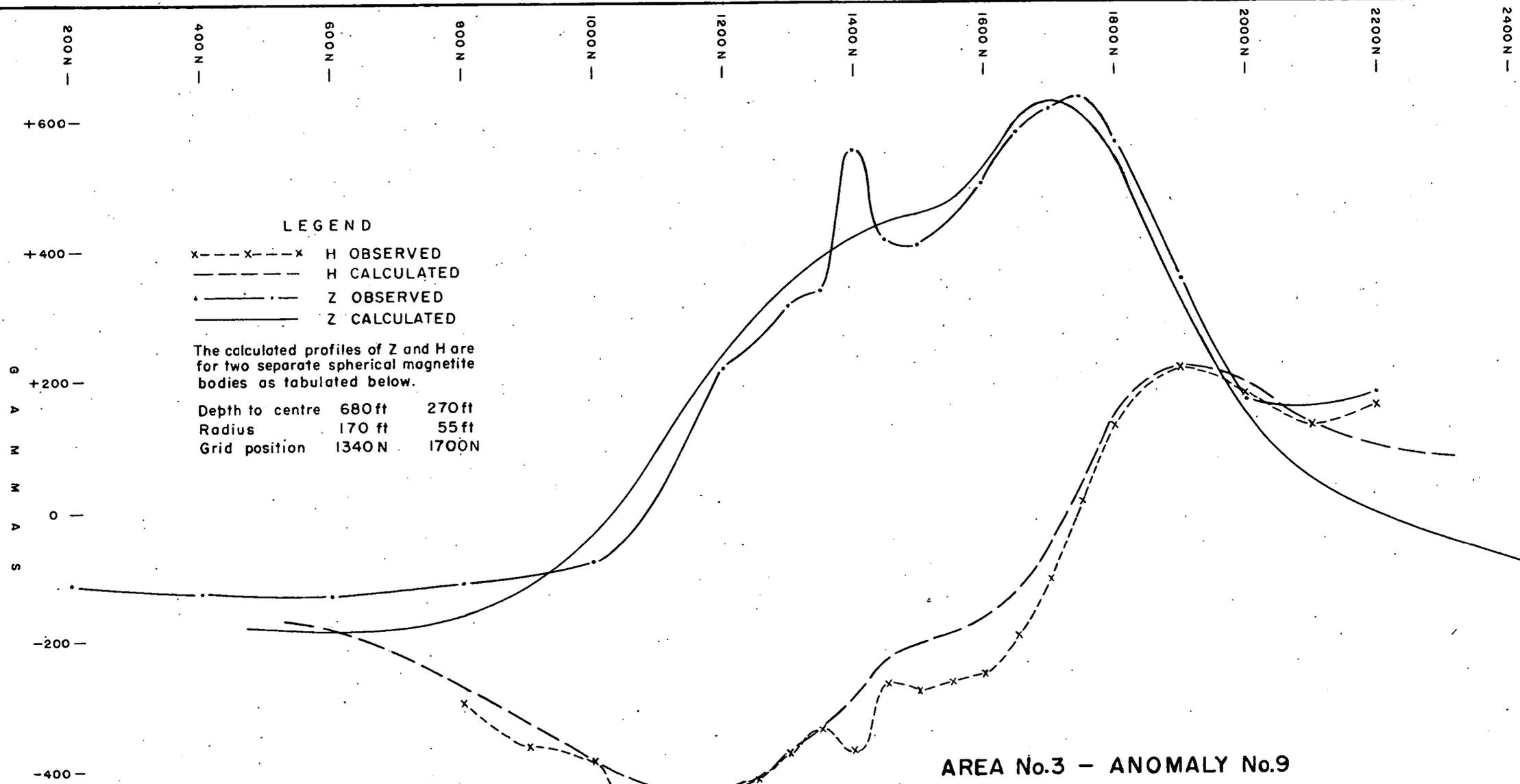
The calculated profiles of Z and H are for a spherical magnetite body of 90 feet radius and depth to centre 340 feet below grid position 4545N.



AREA No.3 - ANOMALY No.4  
 OBSERVED AND CALCULATED PROFILES  
 OF VERTICAL Z AND HORIZONTAL H MAGNETIC INTENSITY  
 ALONG TRAVERSE 16,400W

Geophysical Branch, Bureau of Mineral Resources Geology and Geophysics.  
 To Accompany Record No. 1962/148  
 G 110 - 78

AREA No.3 - ANOMALY No.9  
OBSERVED AND CALCULATED PROFILES  
OF VERTICAL Z AND HORIZONTAL H MAGNETIC INTENSITY  
ALONG TRAVERSE 9200W

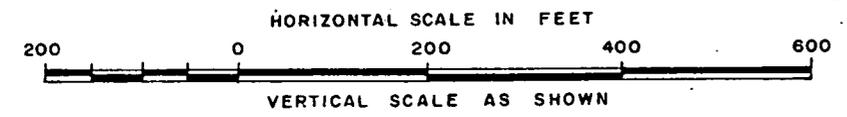


LEGEND

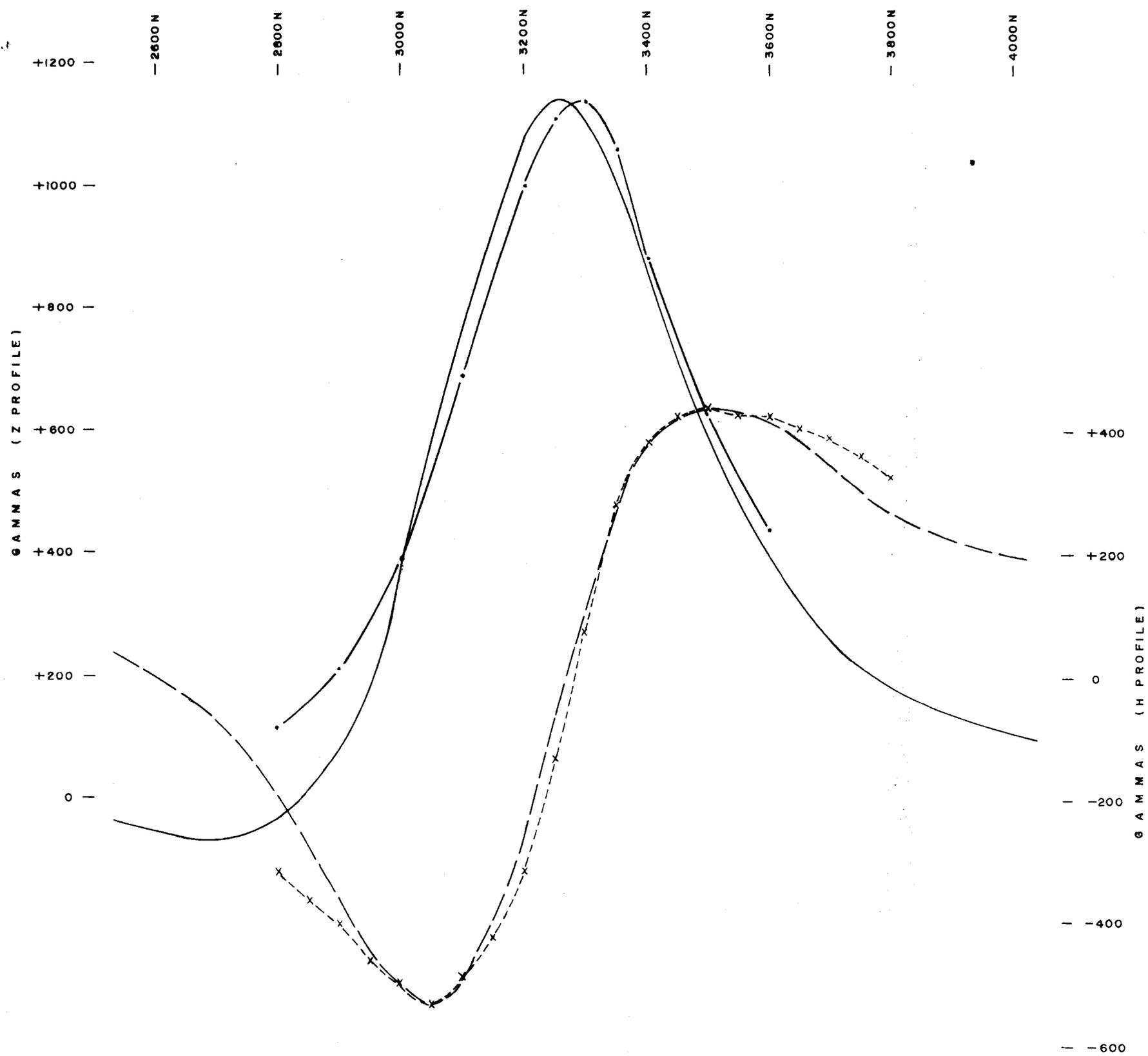
- x---x---x H OBSERVED
- H CALCULATED
- ..... Z OBSERVED
- Z CALCULATED

The calculated profiles of Z and H are for two separate spherical magnetite bodies as tabulated below.

Depth to centre	680 ft	270 ft
Radius	170 ft	55 ft
Grid position	1340 N	1700 N

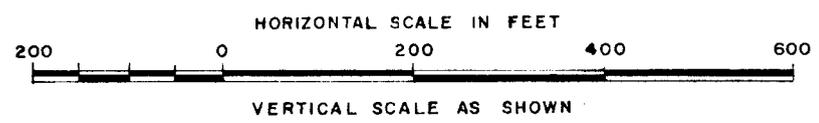


Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics.  
To Accompany Record No. 1962/148  
G 110 - 79

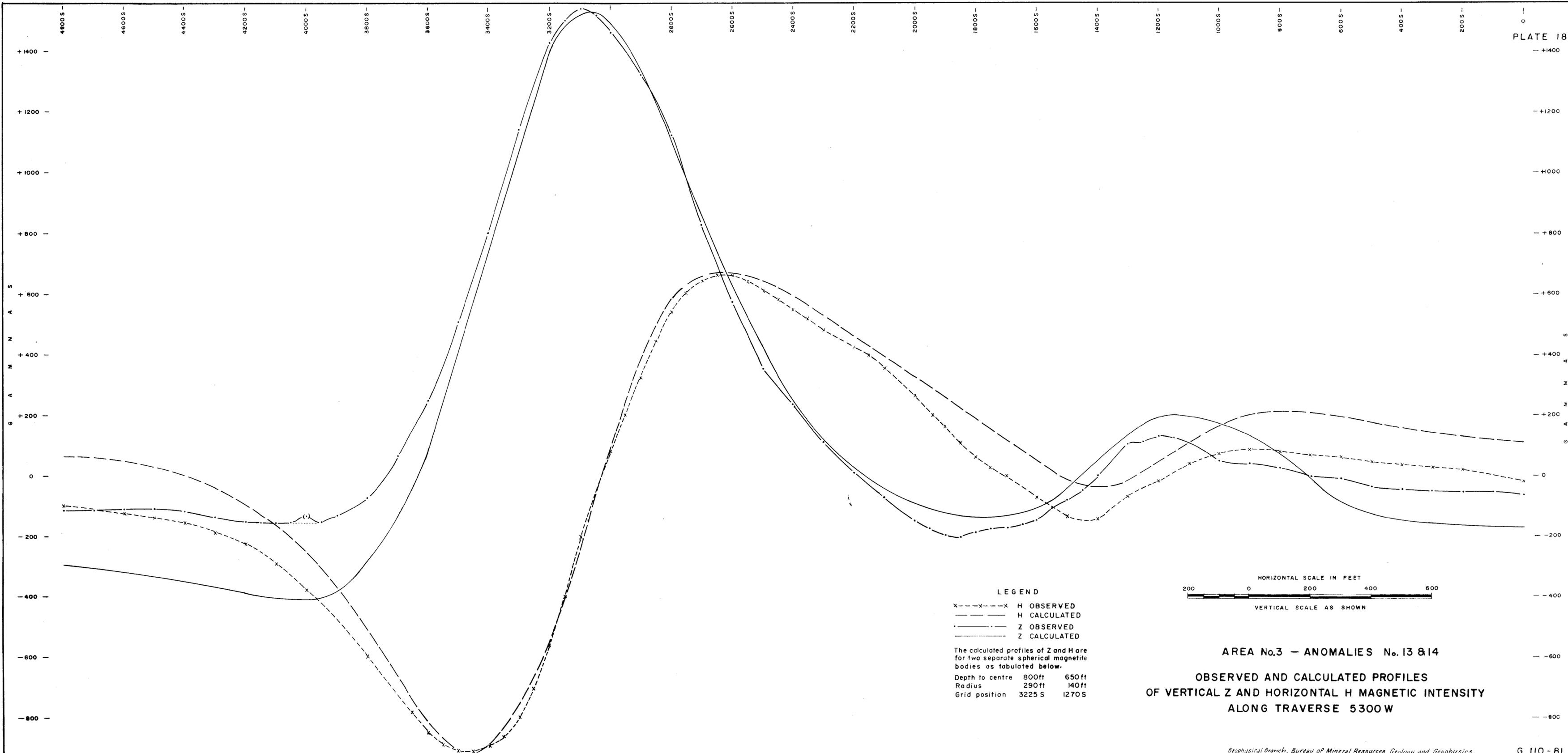


**LEGEND**  
 x---x---x H OBSERVED  
 --- H CALCULATED  
 ····· Z OBSERVED  
 ——— Z CALCULATED

The calculated profiles of Z and H are for a spherical magnetite body of 135 feet radius and depth to centre 435 feet below grid position 3175 N



**AREA No.3 - ANOMALY No.10**  
**OBSERVED AND CALCULATED PROFILES**  
**OF VERTICAL Z AND HORIZONTAL H MAGNETIC INTENSITY**  
**ALONG TRAVERSE 8600W**

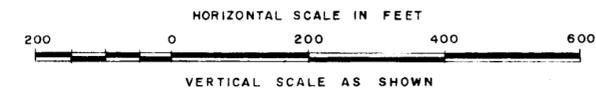


**LEGEND**

x---x---x H OBSERVED  
 --- H CALCULATED  
 . . . . . Z OBSERVED  
 --- Z CALCULATED

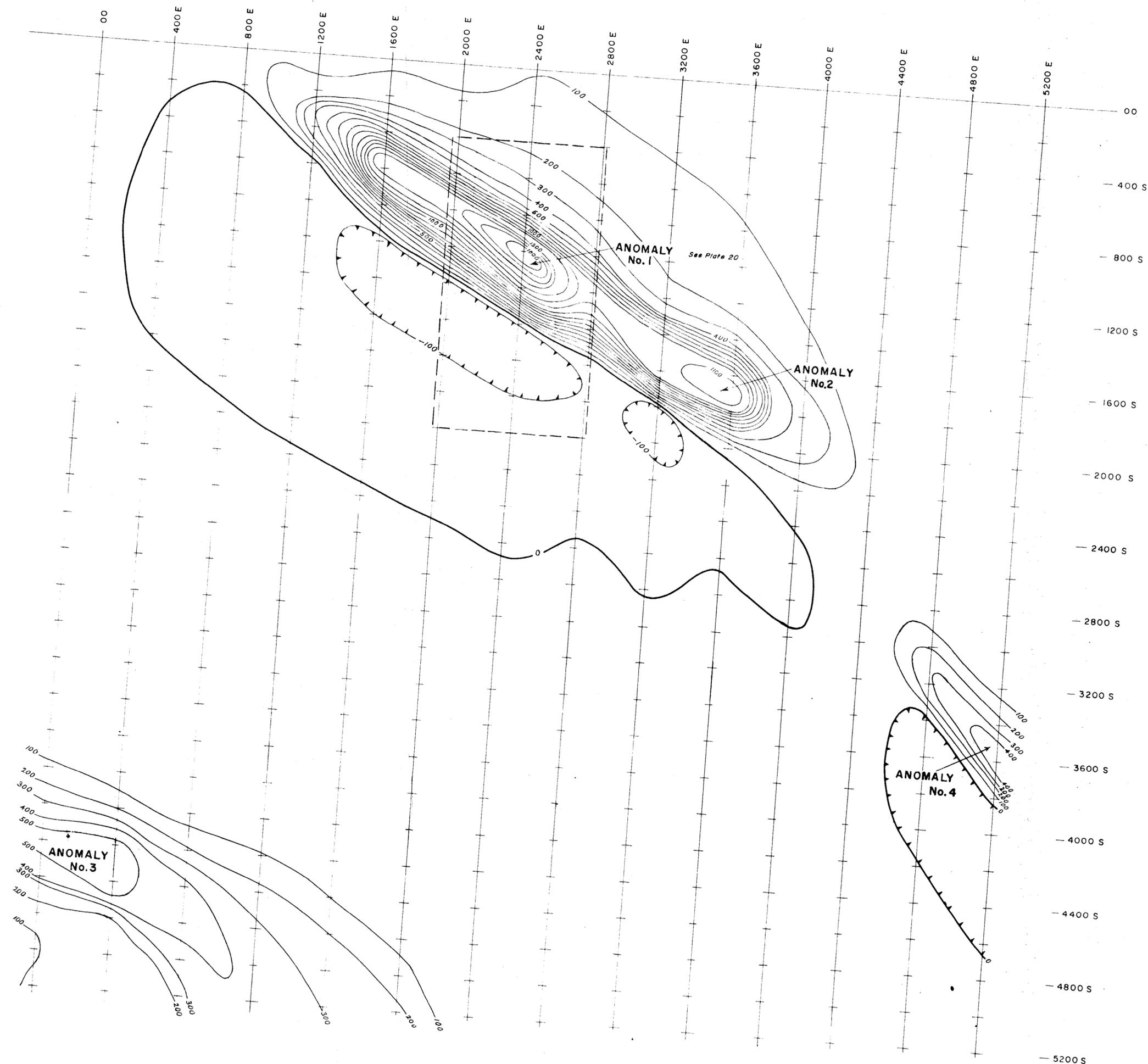
The calculated profiles of Z and H are for two separate spherical magnetite bodies as tabulated below.

Depth to centre	800ft	650ft
Radius	290ft	140ft
Grid position	3225 S	1270 S



**AREA No.3 - ANOMALIES No. 13 & 14**

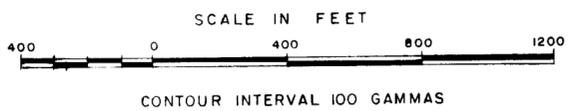
**OBSERVED AND CALCULATED PROFILES OF VERTICAL Z AND HORIZONTAL H MAGNETIC INTENSITY ALONG TRAVERSE 5300 W**



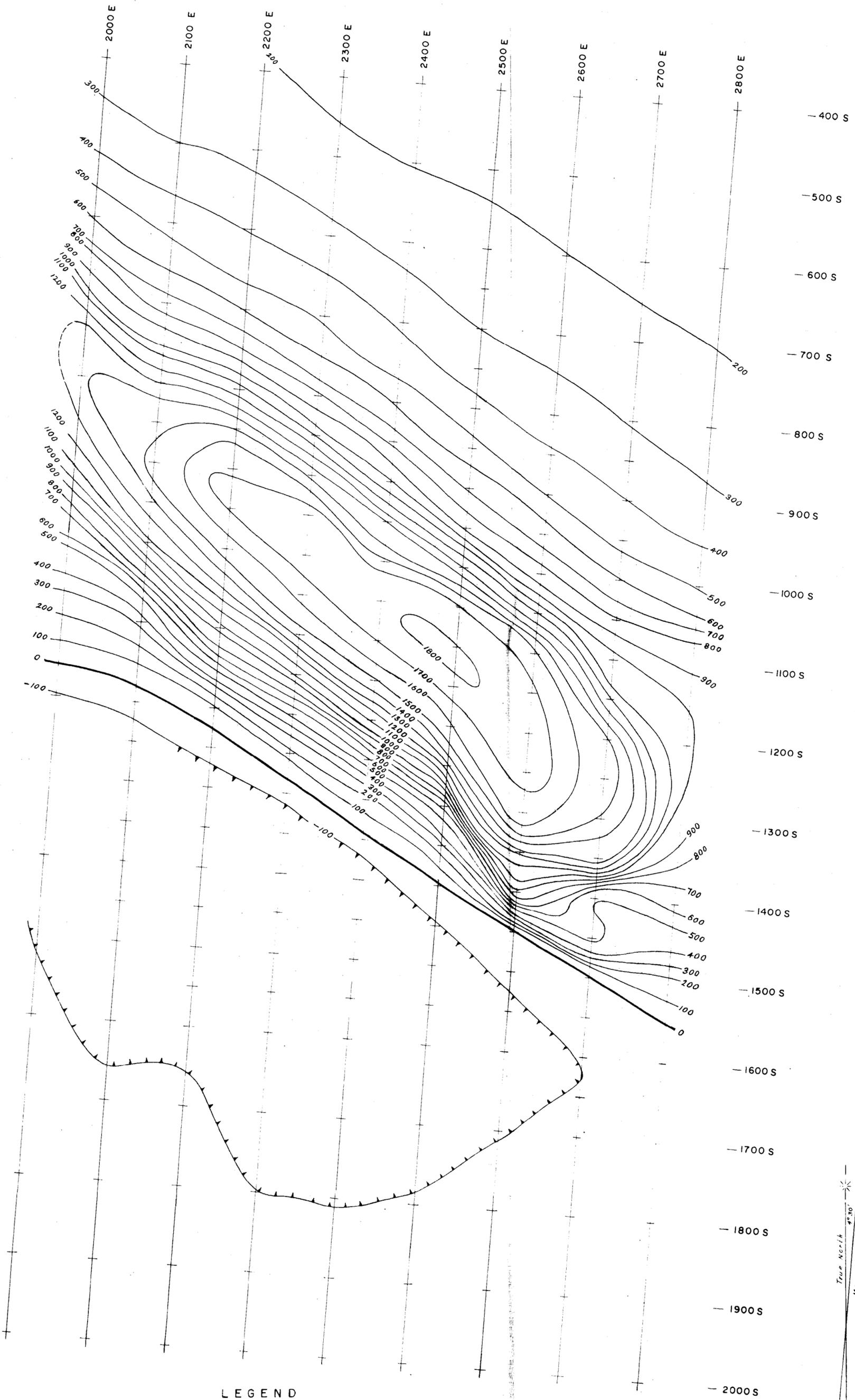
LEGEND

- MAGNETIC CONTOURS
- MAGNETIC LOW
- MAGNETOMETER STATIONS
- BOUNDARY OF DETAILED SURVEY AREA

True North 4°30' N  
Magnetic North

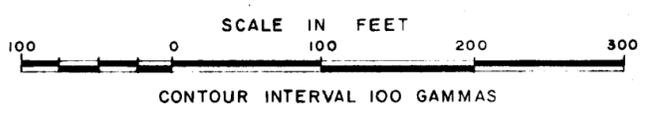


AREA No.5  
CONTOURS OF  
VERTICAL MAGNETIC INTENSITY

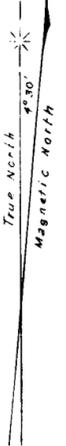


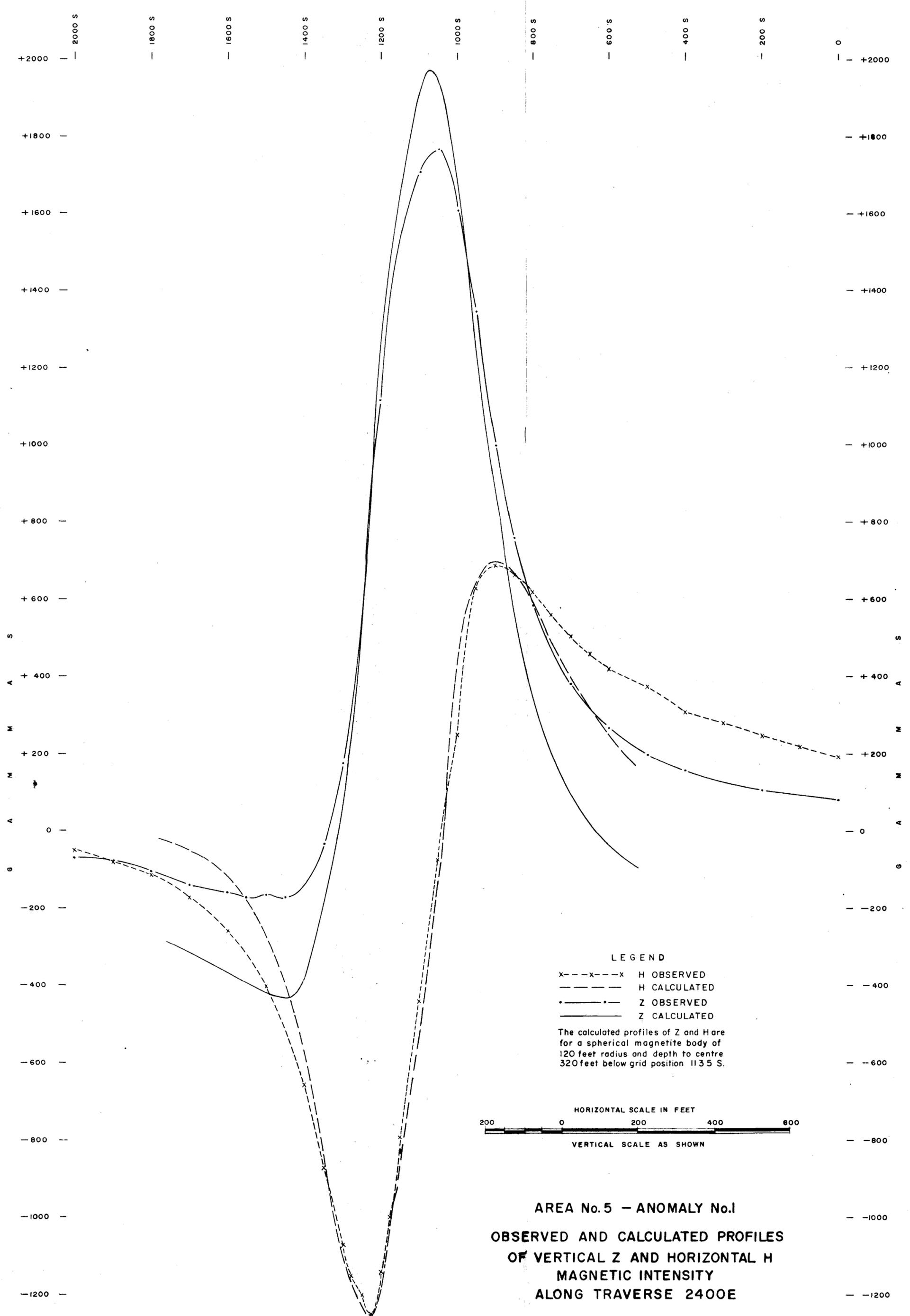
LEGEND

- MAGNETIC CONTOURS
- MAGNETIC 'LOW'
- MAGNETOMETER STATIONS



AREA No.5 — ANOMALY No.1  
 CONTOURS OF  
 VERTICAL MAGNETIC INTENSITY

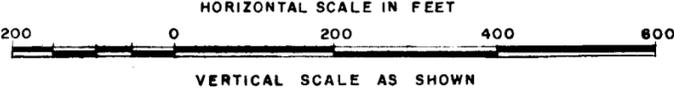




LEGEND

- x---x---x H OBSERVED
- H CALCULATED
- Z OBSERVED
- Z CALCULATED

The calculated profiles of Z and H are for a spherical magnetite body of 120 feet radius and depth to centre 320 feet below grid position 1135 S.



AREA No.5 - ANOMALY No.1  
 OBSERVED AND CALCULATED PROFILES  
 OF VERTICAL Z AND HORIZONTAL H  
 MAGNETIC INTENSITY  
 ALONG TRAVERSE 2400E